Amendments to the Claims

This listing of the Claims will replace all prior versions and listings of the claims in this patent application.

Listing of the Claims

1. (Original) A method for forming an interconnect structure, comprising the steps of:.

a) providing an insulating layer over a semiconductor structure;

b) forming an opening in said insulating layer;

c) forming a fill layer comprised of Cu and Ti over insulating layer;

d) in a nitridation step, nitridizing said fill layer to form a self-passivation layer comprised of titanium nitride over said fill layer.

2-31. (canceled)

32. (new) An interconnect structure comprising.

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer; and

a self-passivation layer comprised of titanium nitride over said fill layer.

33. (new) The structure according to Claim 32 further comprising a barrier layer over said insulating layer and underlying said fill layer.

34. (new) The structure according to Claim 32 wherein said insulating layer is comprised of a low-k material.

35. (new) The structure according to Claim 32 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

36. (new) The structure according to Claim 32 wherein said opening is a dual damascene shaped opening.

37. (new) The structure according to Claim 33 wherein said barrier layer comprises TaN.

38. (new) The structure according to Claim 33 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium and wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

39. (new) The structure according to Claim 33 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

40. (new) The structure according to Claim 32 wherein said Ti is essentially uniformly distributed through said fill layer.

41. (new) An interconnect structure comprising.

an insulating layer over a semiconductor structure having an opening therein;

a barrier layer over said insulating layer conformally within said opening;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer and overlying said barrier layer; and

a self-passivation layer comprised of titanium nitride over said fill layer.

42. (new) The structure according to Claim 41 wherein said insulating layer is comprised of a low-k material.

43. (new) The structure according to Claim 41 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

44. (new) The structure according to Claim 41 wherein said opening is a dual damascene shaped opening.

45. (new) The structure according to Claim 41 wherein said barrier layer comprises TaN.

46. (new) The structure according to Claim 41 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium and wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

47. (new) The structure according to Claim 41 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

48. (new) The structure according to Claim 41 wherein said Ti is essentially uniformly distributed through said fill layer.

49. (new) An interconnect structure comprising.

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer wherein said Ti is essentially uniformly distributed through said fill layer; and

a self-passivation layer comprised of titanium nitride over said fill layer.

50. (new) The structure according to Claim 49 further comprising a barrier layer over said insulating layer and underlying said fill layer.

51. (new) The structure according to Claim 49 wherein said insulating layer is comprised of a low-k material.

52. (new) The structure according to Claim 49 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

53. (new) The structure according to Claim 49 wherein said opening is a dual damascene shaped opening.

54. (new) The structure according to Claim 50 wherein said barrier layer comprises TaN.

55. (new) The structure according to Claim 50 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium and wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

56. (new) The structure according to Claim 50 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.